

Serial No.: 10/029,272  
Group Art Unit: 3749  
Examiner: Josiah C. COCKS

### **REMARKS**

Claim 3 has been canceled and incorporated into claim 1. Claims 5 and 6 have been amended to both depend from claim 1, instead of canceled claim 3. The specification has been amended to correct obvious errors in spelling and syntax. All of the amendments are fully supported by the original disclosure of this application and therefore do not constitute the introduction of any new matter into this case.

The amendments are proposed pursuant to Rule 116 to place the application fully in condition for allowance.

Claims 1, 2 and 4-7 remain pending upon entry of the amendments to the claims above.

### **Claim Rejections under 35 U.S.C. § 102**

In the claimed invention, the heating side 5 in the loop pipe 1 is separated by a partition 3 in an upper zone and a lower zone. The partition 3 has a narrow piping element or capillary 4. The narrow piping element 4 has a top opening end 4A and a bottom opening end 4B. The top opening end 4A is located in the upper zone of the partition 3. The bottom opening end 4B is located in the lower zone of the partition 3. There is a damper 2 (or baffle) located near the top opening end 4A. When the working fluid in the lower zone flows to the upper zone, the working fluid must be forced to flow through the narrow piping element 4 from the bottom opening end 4B and eject out of the top opening end 4A. The claimed heat pipe is used to depressurize a closed pipe system filled with a working fluid. When one end of the pipe is heated, the working fluid evaporates from liquid phase to a gaseous state (when the pressure in the pipe is low, the boiling point of the working fluid decreases, and therefore the fluid evaporates at a lower temperature). The evaporated liquid moves to the cooling side of the pipe system, and condenses back into liquid after losing its heat in the process. Thereafter,

the liquid returns to the heating end of the pipe by a wick/capillary inside the pipe that conveys liquid via capillary action. Such closed system is commonly referred to as a "heat pipe".

An important distinction of the claimed invention is that the damper 2 has no function with regard to the adjustment in the flow of the working fluid, in other words, the damper 2 does not prevent flow through the piping element 4 (page 5, line 23-page 6, line 13; Fig. 2). There is no true equivalent to the damper 2 of the claimed invention in the cited reference to Hebert. The Examiner has equated the antisiphon valve 44 of Hebert to the damper 2 of the claimed invention, however, the sole function of the antisiphonvalve 44 of Hebert is to totally block/prevent reverse flow of fluid into the channel 34 (column 7, lines 35-37; Fig. 3). This critical difference alone should clearly distinguish the claimed invention over the reference to Hebert. If the Examiner believes that further amendment of claim 1 would be required to highlight this distinction and in order to place the application in condition for allowance, the Examiner is invited to add the limitation, "wherein the damper is a deflector", or some similar language, to claim 1.

In addition, with regard to the reference to Hebert, this reference uses the chimney effect to drive all of the vapor and bubbles in the overflow two-phase working fluid to pass the tube wall and to absorb the heat from the tube wall (see reference elements 16, 34, 112 in Figures 1-6). In the device of Hebert, there is no physical or mechanical part to stop the downward flow of pressure due to the expanded volume during the evaporation phase. In contrast, in the claimed invention, a cannon effect is utilized to drive all the vapor and bubbles in the overflow two-phase working fluid to pass the tube wall and to absorb the heat from the tube wall. Further, in the claimed invention, there is a physical mechanical part (partition 3 in the bottom of the tubular

closed system) to stop the downward flow pressure due to the volume expansion during phase change to vapor and this downward flow pressure due to the expansion of volume during evaporation phase can be completely converted to push the overflow two-phase working fluid to move upwards. Hence, the flow speed over the heat exchanging surfaces can be amplified, and thus the overall heat transfer capacity is greatly improved.

In addition, the counter-gravity mechanism of the claimed invention is entirely different from that of the reference to Hebert. In the reference to Hebert, the heat pipe is a traditional looped heat pipe, and because the connection of the liquid part can compensate the liquid level during boiling for the reverse flow when the heat source and the sink are switched, the counter thermosyphon gravity effect is relatively weak in comparison to the claimed invention. In the claimed invention, the liquid part is physically separated into two parts by the partition 3 (stopping plate), and the liquid level during the boiling phase during reverse flow when the heat source and the cooling source are switched, will stop at the level of the partition 3, and the counter thermosyphon capacity is considerably stronger than in the device of Hebert.

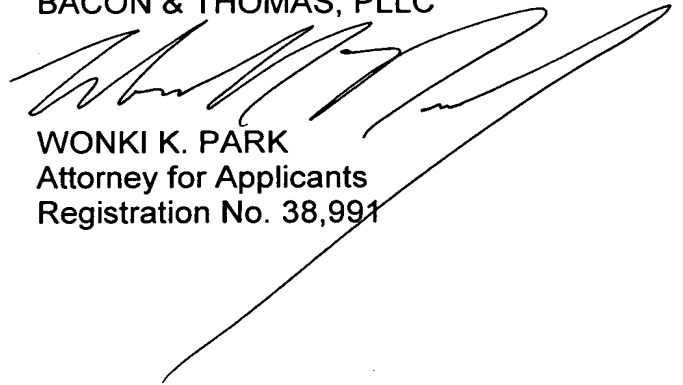
In view of the amendments to the claims and the remarks above, withdrawal of this rejection is respectfully requested.

In summary, it is respectfully submitted that none of the prior art individually or collectively shows the invention as claimed. Accordingly, withdrawal of the rejection of the claims appears to be warranted and the same is respectfully requested. In the event there are any outstanding matters remaining in the present application which can

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be resolved by a telephone call or facsimile communication to Applicants' Attorney, the Examiner is invited to contact the undersigned by telephone or facsimile at the numbers provided below.

Respectfully submitted,  
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